

WHAT IS CLAIMED IS:

1. A combination weighing device, comprising:

a plurality of sets of hoppers, each set having a first hopper that stores articles and
a second hoppers that is disposed above the first hopper to supply articles to the first
5 hopper;

a plurality of measuring devices that are arranged with respect to each of the
plurality of first hoppers and plurality of second hoppers, the plurality of measuring
devices measuring articles in the first hoppers and second hoppers;

calculation means that performs combination calculation based on measurement
10 values of articles of the first hoppers provided by the measuring devices;

determining means that determines whether or not a total measurement value of
articles in first and second hoppers of one of the sets of hoppers exceeds a predetermined
value when the combination calculation performed by the calculation means is not
complete; and

15 additional supply means that supplies additional articles from the second hopper to
the first hopper when the determining means determines that the total measurement value
does not exceed the predetermined value.

2. The combination weighing device set forth in claim 1, wherein

20 the determining means determines, whether or not the total measurement value of
articles in first and second hoppers of another set of hoppers will exceed the
predetermined value.

3. The combination weighing device set forth in claim 1, wherein

25 the measurement value is a weight of articles in the first hopper that can be
measured by the weighing device.

4. The combination weighing device set forth in claim 1, wherein

30 the predetermined value is a value based upon article density and the volume of
articles that the first hopper can accommodate.

5. The combination weighing device set forth in claim 1, further comprising:
a plurality of feeders that respectively correspond to each of the plurality of second
hoppers, the plurality of feeders supplying articles to the corresponding second hoppers;
supply quantity control means that controls a quantity of articles to be supplied
5 from the feeders to the second hoppers; and
setting means that sets a supply target value of articles to be supplied by the
feeders to the second hoppers based upon the total measurement value of articles in the
first and second hoppers of the set of hoppers and the predetermined measurement value;
wherein the supply target control means controls the quantity of articles to be
10 supplied to the second hoppers of the set of hoppers based upon the measurement value of
articles in the second hopper so that the quantity of articles supplied from the feeders to
the second hopper equals to the supply target value.

6. The combination weighing device set forth in claim 5, wherein
15 the supply quantity control means controls the quantity of article to be supplied
from the feeders to the second hopper of the set of hoppers based upon a deviation
between the measurement value of articles in the second hopper of the set of hoppers and
the predetermined supply target value.

20 7. A combination weighing device, comprising:
a plurality of first hoppers that store articles;
a plurality of second hoppers that are disposed above the plurality of first hoppers,
each second hopper respectively corresponding to each first hopper and storing articles in
the corresponding first hopper;
25 a plurality of feeders that respectively correspond to each of the plurality of second
hoppers, the plurality of feeders supplying articles to the corresponding second hoppers;
supply quantity control means that control the quantity of articles supplied from
the feeders to the second hoppers;
a plurality of measuring devices that are arranged with respect to each of the
30 plurality of first hoppers and plurality of second hoppers, the plurality of measuring
devices measuring articles in the first hoppers or second hoppers;

setting means that sets a supply target value of articles to be supplied by the feeders to the second hoppers; and calculation means that performs combination calculation based on measurement values of articles of the first hoppers provided by the measuring devices; and

wherein the supply quantity control means controls a quantity of article to be supplied from the feeders to the second hoppers based upon a deviation between the measurement value of articles in the second hoppers and the predetermined supply target value.

8. A combination weighing device, comprising:

a plurality of sets of hoppers, each set having a first hopper that stores articles and a second hoppers that is disposed above the first hopper to supply articles to the first hopper;

a plurality of feeders that respectively correspond to each of the plurality of second hoppers, the plurality of feeders supplying articles to the corresponding second hoppers;

supply quantity control means that controls a quantity of articles to be supplied from the feeders to the second hoppers; and

a plurality of measuring devices that are arranged with respect to each of the plurality of first hoppers and plurality of second hoppers, the plurality of measuring devices measuring articles in the first hoppers and second hoppers;

calculation means that performs combination calculation based on measurement values of articles of the first hoppers provided by the measuring devices;

additional supply means that supplies additional articles from the second hoppers to the first hoppers when the combination calculation performed by the calculation means is not complete;

wherein the supply quantity control means controls the quantity of articles to be supplied from the feeders to the second hoppers so that the total measurement value of the measurement value of articles in the first and second hoppers of the set of hoppers does not exceed the predetermined value.

9. A combination weighing device, comprising:

a plurality of sets of hoppers, each set having a first hopper that stores articles and a second hoppers that is disposed above the first hopper to supply articles to the first hopper;

5 a plurality of measuring devices that are arranged with respect to each of the plurality of first hoppers and plurality of second hoppers, the plurality of measuring devices measuring articles in the first hoppers and second hoppers;

calculation means that performs combination calculation based on measurement values of articles of the first hoppers provided by the measuring devices;

10 determining means that determines whether the combination calculation performed by the calculation means is complete;

selection means that performs combination calculation based on measurement values of articles of the first and second hoppers when the combination calculation performed by the calculating means was not complete; and

15 additional supply means that supplies articles from the second hopper selected by said selection means to the corresponding first hopper if the selection means selects the second hopper as a result of the combination calculation.

10. A combination weighing device, comprising:

20 a plurality of sets of hoppers, each set having a first hopper that stores articles and a second hoppers that is disposed above the first hopper to supply articles to the first hopper;

a plurality of measuring devices that are arranged with respect to each of the plurality of first hoppers and plurality of second hoppers, the plurality of measuring devices measuring articles in the first hoppers and second hoppers;

25 calculation means that performs combination calculation based on measurement values of articles of the first hoppers provided by the measuring devices; and

secondary calculation means that performs, when a combination in the combination calculation performed by the calculating means was complete, combination calculation based on measurement values of articles in the second hoppers and the first
30 hoppers not selected in the combination calculation performed by the calculation means.

11. The combination weighing device set forth in claim 10, further comprising:

a plurality of feeders that respectively correspond to each of the plurality of second
hoppers, the plurality of feeders supplying articles to the corresponding second hoppers;
and

5 supply quantity control means that controls a quantity of articles supplied from the
feeders to the second hoppers;

wherein when the combination calculation performed by the secondary calculation
means is not complete and when there is an empty second hopper, the supply quantity
control means controls the quantity of articles to be supplied from the feeders to the empty
second hopper such that the combination calculation performed by the secondary
10 combination calculation means can be completed.

12. The combination weighing device set forth in claim 10, wherein
the calculating means determines whether a plurality of combinations in one
combination calculation are complete or not, and selects from amongst that plurality of
15 combinations a combination that completes a secondary combination calculation
performed by the secondary combination calculating means.

20